these examples, as in the example shown in **FIG. 12**, the common element is that there is a semirigid support member, attached at least in part to the outer periphery of the display membrane.

[**0067**] **FIG. 13** shows a further embodiment **1300** of a collapsible display, referred to herein as an "umbrella" configuration. The display includes a deformable membrane **1302**, a hub **1304**, and a plurality of support members **1306** each connected to the hub **1304** and secured to positions along an outer periphery **1308** of the deformable membrane **1302**. The plurality of support members **1306** are connected to the hub **1304** by releasable locking joints or hinges **1301**, enabling the display **1300** to be releasably locked in an open position where the deformable membrane **1302** is extended by the support members **1306**, and to be placed in a closed position where the deformable membrane **1302** is collapsed by the support members **1306**.

[**0068**] **FIG. 14** shows the umbrella configuration in its collapsed configuration **1400**. In an instance of an umbrella display **1300** where the expanded area has a square shape and each support member **1306** may be said to have unit length, then each edge of the expanded display **1300** has a length of sqrt(2), or approximately 1.4, times the length of a given support member. Since the length of the support member defines the maximum dimension of the collapsed display **1402**, we see that the umbrella configuration also enables the construction of displays that are larger in more than one dimension when expanded than their maximum dimension when collapsed.

[**0069**] In the transition from the expanded configuration of **FIG. 13** to the collapsed configuration of **FIG. 14**, it can clearly be seen that the support members **1306** support the display membrane **1302** as the umbrella display changes from its linear collapsed configuration to its final planar expanded configuration—that is, as the display membrane is deformed from being substantially perpendicular to the plane of the display to being within the plane of the display. The same is true when the umbrella display is returned to its collapsed configuration.

[**0070**] Various additional configurations of umbrella displays may be adapted from existing known technologies involving collapsible automobile windshield shades which likewise include hubs attached to a flexible material using support members. Various techniques for expanding and collapsing flexible materials between larger and smaller areas are described in U.S. Pat. Nos. 6,095,230 and 6,135,191. In all of these examples, as in the example shown in **FIG. 13** and **FIG. 14**, the common element is the fact that the support members attach to a hub and are attached at least in part to the outer periphery of the display membrane.

[**0071**] **FIG. 15** shows an embodiment of a collapsible display **700** where display pixels are activated by a display wand **1500** or the like. The display wand may be any device that generates an electric field or other signal to activate particular pixels, and can be moved over the display area **702** to create visual information. The display wand **1500** may be affixed to the display area **702** or may be detached therefrom. The display wand **1500** may have appropriate sensors and the like for determining its position on the display area and activating display pixels accordingly. The display wand **1500** may also include a passive tracking means by which an active tracking means (within, e.g., an electronic device attached to the display or the collapsible display itself) can determine the position of the display wand **1500** on the display area. This tracking information can then be used to provide appropriate display instructions for the display wand **1500**, which in turns allows the display wand **1500** to activate display pixels accordingly.

[**0072**] Various technologies may be used for the display wand **1500**, such as those described in U.S. Pat. Nos. 5,389,945 and 6,473,072. For example, in U.S. Pat. No. 5,389,945, a hand-held display wand, connected to a computing device and containing a linear array of addressing electrodes, is passed over a gyricon display sheet to write information transmitted from the computing device onto the gyricon display sheet; registration marks are provided on both sides of the display sheet for cooperating with suitable sensors (such as optical or magnetic) in the display wand in order to track the wand speed and alignment.

[**0073**] Additionally, the display **700** may be touch-sensitive or be activated by a stylus in a similar manner to PDAs. For example, in U.S. Pat. No. 5,389,945, a battery-operated stylus having about 100 volts output in series with a very large resistor, is used to write upon a gyricon display sheet in a manner comparable to the addressing scanning array, i.e., by causing the gyricon bails to rotate. These known display wand techniques can be applied directly to the collapsible displays of the current invention. However, it is also possible to combine these (and other related display wand techniques) advantageously with the additional structural elements of the current invention. For example, in embodiments of the current invention that include a pivot, such as those having the folding fan or brisé fan configurations, the display wand can be attached to the pivot. This enables the display wand to be passed over or under the expanded collapsible display with a single, rapid and convenient "windshield wiper" motion. It also enables the display wand to be shielded by, or even physically combined with, a rugged external case element which is attached to the pivot (e.g., as the uppermost or lowermost element of a brisé fan configuration). As another example, a display wand mounted on a pivot can be added near the point **806** of the pop-up display of **FIG. 11** so that the pop-up portion of the display **802** can be addressed in a manner similar to that just described for the fan display configurations.

[**0074**] Depending on the technologies available to a particular manufacturer to implement the structural substrate of the display and the control layer of the display, embodiments based on a display wand will have certain advantages with respect to mechanical reliability and usefulness as compared to embodiments that do not use a display wand. It is known that particular technologies for the display layer, such as those based on gyricon, are relatively robust with respect to repeated deformation (e.g., bending). In the case of gyricon, the mechanical elements surrounding the twisting-ball display elements are composed of fluids or highly elastic materials (such as thin sheet plastic) and so the display layer is typically undamaged by mechanical stress when deformed. On the other hand, addressing circuitry in the control layer will include conductors (such as copper traces) and possibly semiconductors (such as flexible transistors).

[**0075**] Different materials will have different types of failure modes caused by repeated deformation. For example, if the addressing elements are constructed from materials